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The Aristotelian *Natural Problems*: origins and success

"Why are great excesses disease-producing? – Is it because they produce either excess or defect? And these are disease?";

"Why does cabbage prevent hangovers? – Is it because it has juice that is sweet and able to cleanse, whereas in itself it is cold?";

"Why are the melancholic highly sexual? – Is it because they are full of breath, and the seed is a discharge of breath?".

1§1 Examples such as these may serve to illustrate, in summary, the wide diversity of questions and answers dealt with in the *Natural Problems*, attributed to Aristotle (but probably only partially authentic).[1] Over 900 chapters of this sort have been collected here, many of which demonstrate a specific link with Aristotle's authentic texts by creatively casting them in a Q&A format, while also blending in traditional and novel ideas (esp. Hippocratic and Theophrastean).[2]

1§2 The *Problems* is the third largest work in the *corpus Aristotelicum*, yet at the same time it is one of the least studied. This is unfortunate, because the collection "has much to tell us about the specific nature of philosophical and scientific inquiry in the Lyceum during Aristotle's life and especially in the years following his death," as Robert Mayhew rightly observes.[3] It is accepted that Aristotle initiated the work by authoring an unknown number of chapters in it, but most of the content should be ascribed to his acolytes in the Lyceum.[4] As such, the uncertainty about the historical authorship, far from being a mere scholarly issue, may hint at the popularity of the genre of natural problems in a large and largely anonymous scientific community in Aristotle's school.[5]

1§3 Scholars acknowledge that the *Problems* do not necessarily have to be by Aristotle to be generally Aristotelian.[6] By finding its origin in the Lyceum, the collection is firmly built around Aristotle's concept of philosophical knowledge as causal knowledge, applied to the study of concrete natural phenomena and their material and efficient causes. The collection deals with a wide range of particular – and often very peculiar – difficulties in the broad field of ancient Greek 'physics', thus straddling a large variety of questions pertaining to ancient medicine, physiology, botany, psychology, meteorology, astronomy, music, etc., but also including problems relating to ethics and even justice.

1§4 What makes the *Problems* a unique source of ancient scientific learning is that it, indeed, originated from debates in Aristotle's closed intellectual circle (the Lyceum) but became immensely popular far beyond Aristotle's educational context in the times to follow. It left a lasting legacy both in learned and popular cultures from Antiquity up to the Modern Era, and became highly influential also beyond the geographical boundaries of the Occident in the form of Syriac, Arabic and Hebrew translations. A comprehensive analysis of how the *Problems* circulated in different historical settings, from the time of its creation up to its demise, offers a fascinating, kaleidoscopic perspective on the shifting socio-intellectual value of a very influential, but largely forgotten, genre of natural scientific writing that played a prominent role, for over two millennia, in the study and understanding of nature and its phenomena.

1§5 The *Problems* have gained more and more scholarly attention in the last decades, especially in the fields of ancient philosophy and Medieval and Renaissance studies.[7] Yet, a study of how the collection circulated in the Roman Empire remains a blind spot in contemporary scholarship. Indeed, the Imperial Era is a seminal period for the history of the text, not just as a conduit between Aristotle and the Middle Ages – which in itself is essential for explaining the subsequent Arabic and Latin uptake of the *Problems* more clearly – but also for the wealth of sources and testimonies it offers about the collection's ancient readership and concrete use.[8] The main objective of this study is to cross this scholarly divide. My goal is to examine how the *Problems* were read in the first centuries of the Imperial period. In so doing, I will specifically focus on Platonic milieus, zooming in on three distinguished Platonic readers: viz. Plutarch of Chaeronea, L. Calvenus Taurus, and Apuleius of Madauros. Examining how the

Aristotelian *Problems* were picked up by these Platonic readers is interesting not just for the history of the text as such but also for questions relating to intellectual allegiance and profiling. How does Aristotelianism interact with Platonism in these authors, and to what degree is there an intention towards unison of both traditions, or not?[9]

1§6 Methodologically, this study departs from the view that readers play a prominent role in validating scientific knowledge: it is they who will (or will not) attribute authority to the author's scientific claims and arguments by accepting, developing, reusing, transforming, interpreting, updating, misunderstanding, forging, criticizing, deriding, or rejecting them – always in agreement with specific intellectual and societal situations.[10] Accordingly, this study will put specific emphasis on concepts relating to the act of reading itself and the use and consultation of books (independent of their actual publication format). Which reading contexts can we distinguish in the literature and what do we learn about the reader's response to what was read? Answering questions like these will contribute to our better understanding of how the Aristotelian genre of natural problems revived and gained in popularity beyond the confines of the Lyceum, in an era that was pivotal to the transmission of Aristotelianism to many generations to come.

Plutarch

2§1 In intellectual circles, like Plutarch's, first of all, the famous biographer and moralist from the first–second century CE, the *Problems* were taken *au sérieux* – at least within the limits of spoudogelastic intellectual discussions held at dinner parties and symposia.[11] In line with convivial decorum, these discussions mediated between seriousness and play (σπουδή – παιδιά), often occasioning playful demonstration of all-round education relating to the physical world.[12] At the same time, the genre of natural problems also provided useful topics for debate in Plutarch's philosophical school in his hometown Chaeronea, where they formed an integral part of his natural philosophical curriculum.[13] Even though these discussions are very much tongue in cheek at points, they never turn to plain derision (take, for instance, *Table Talk* III 3: “Why are women least liable to drunkenness but old men most quickly?”; *Causes of Natural Phenomena* 36: “Why are bees quicker to sting people who have just committed adultery?”).

2§2 In one of his *Table Talk* (VIII 10), Plutarch writes that his Roman friend and patron, L. Mestrius Florus, obtained a copy of Aristotle's *Problems* that had been brought to Thermopylae, and shared it with his friends for discussion during daytime strolls (the so-called *peripatos*).[14] Plutarch writes that one such problem came up one way or another (οὐκ οἶδ' ὅπως) at a dinner party: “Why are dreams particularly unreliable in the fall months?”. We read that Aristotle had already solved the problem (although it cannot be traced in the extant collection: see fr. 242 R³). The Stagirite explained, so Plutarch writes, that fresh fruit and grain, at the time of harvest, produce much unruly breath (πνεῦμα) in the body, which causes bad dreams. Plutarch's peers do not simply accept Aristotle's theory but take it as a starting point for further debate by adding alternative explanations.

Προβλήμασιν Ἀριστοτέλους φυσικοῖς ἐντυγχάνων Φλώρος εἰς Θερμοπύλας κομισθεῖσιν αὐτός τε πολλῶν ἀποριῶν, ὅπερ εἰώθασι πάσχειν ἐπιεικῶς αἱ φιλόσοφοι φύσεις, ὑπεπίμπλατο καὶ τοῖς ἐταίροις μετεδίδου, μαρτυρῶν αὐτῷ τῷ Ἀριστοτέλει λέγοντι τὴν πολυμάθειαν πολλὰς ἀρχὰς ποιεῖν. τὰ μὲν οὖν ἄλλα μεθ' ἡμέραν οὐκ ἄχαριν ἡμῖν ἐν τοῖς περιπάτοις διατριβὴν παρέσχε· τὸ δὲ λεγόμενον περὶ τῶν ἐνυπνίων, ὥς ἐστὶν ἀβέβαια καὶ ψευδὴ μάλιστα περὶ τοὺς φυλλοχόους μῆνας, οὐκ οἶδ' ὅπως ἐφ' ἑτέροις λόγοις πραγματευσαμένου τοῦ Φαβωρίνου μετὰ τὸ δεῖπνον ἀνέκυψεν. τοῖς μὲν οὖν σοῖς ἐταίροις ἐμοῖς δ' υἱοῖς ἐδόκει λευκέναι τὴν ἀπορίαν Ἀριστοτέλης, καὶ οὐδὲν ὥοντο δεῖν ζητεῖν οὐδὲ λέγειν ἄλλ' ἢ τοὺς καρπούς, ὥσπερ ἐκεῖνος, αἰτιάσθαι. Κτλ.

Florus, who was engaged in reading a copy of Aristotle's *Natural Problems* that had been brought to Thermopylae, was himself full of questions, as is natural for a philosophical spirit, and shared them with his friends too, proving Aristotle's own statement that “great learning gives many starting-points”. Most of the questions raised provided us with a pleasant pastime during our daytime walks; but the common saying about dreams – that they are especially likely to be unreliable or false in the fall months – somehow came up after dinner, after Favorinus had finished a discourse on other topics. Your friends, my sons, thought that Aristotle had solved the problem, and that there was no point in any further inquiry or discussion, except to say, as he had, that the harvest is to blame. Etc.

(transl. Clement – Hoffleit)

2§3 The passage at hand provides exceptional detail about the availability of the Aristotelian *Problems* in Greco-Roman times. It nicely illustrates how the work passed from hand to hand and from mouth to mouth, showing how it circulated – physically – in the Mediterranean region and provided much *gefundenes Fressen* for intellectual debate in networks of highly educated individuals. Clearly, the Aristotelian *Problems* were not conceived of by Plutarch and his peers as a static text but a dynamic one that was open to further development and adaptation. Aristotle's authority is not simply accepted by them but provides a useful starting point for further debate.^[15] Accordingly, at numerous instances, Plutarch, underlines the novelty of the explanations he records and the conceptual creativity (εὐρησιλογία) that this type of discussion involves.^[16]

2§4 What is also important is that Florus is described in the *Table Talk* passage as a person “filled with questions himself, as is natural for a philosophical spirit” (αὐτός τε πολλῶν ἀποριῶν, ὅπερ εἰώθασι πάσχειν ἐπιεικῶς αἱ φιλόσοφοι φύσεις, ὑπεπίμπλατο). This is probably a veiled allusion to Plutarch's own zetetic/aporetic method in philosophy, which for him is a continuous and open-ended pursuit of the truth.^[17] In his capacity as a Platonic philosopher and a sympathizer of Academic Scepticism, the Chaeronean especially appreciates the inquisitive approach of the genre of natural problems, where explanations are typically phrased interrogatively rather than assertively. This approach is manifest in his *Causes of Natural Phenomena*, where the aetiologies are structured as compound questions: “Is it because X? Or because Y? Or Z?” (πότερον [...]; ἢ [...]; ἢ [...]). It also ties in closely with the Academic ἐποχή Plutarch advocates in scientific matters (*On the Principle of Cold* 955C). In short, by emphasising its search for plausible explanations and potential alternative ones, Plutarch aimed to reconfigure the Aristotelian genre within an essentially Platonic framework.^[18] As such, it was not so much the research in itself of enigmatic natural phenomena that appealed to him, but rather the method employed in addressing them.

2§5 This has underlying educational motivations for Plutarch. As we learn from several passages, the practice of solving natural problems by means of looking for plausible natural explanations provides a virtual training court for intellectual γυμνασία, that is, an argumentative exercise in natural scientific ζήτησις.^[19] This is not, however, a goal in itself. The ultimate goal is to eradicate irrational feelings of fear about divine interventions in the world (think of terrifying eclipses of the sun or moon) and to provide a firm scientific footing for the world's demiurgic ordering.^[20] This point is explicit in *Pericles* 6.1, where Plutarch explains how the natural philosophy of Anaxagoras, and more specifically his search for natural causes of celestial phenomena, triggered an intellectual religious awareness on Pericles' side:

Οὐ μόνον δὲ ταῦτα τῆς Ἀναξαγόρου συνουσίας ἀπέλαυσε Περικλῆς, ἀλλὰ καὶ δεισιδαιμονίας δοκεῖ γενέσθαι καθυπέρτερος, ὅσῃν τὸ πρὸς τὰ μετέωρα θάμβος ἐνεργάζεται τοῖς αὐτῶν τε τούτων τὰς αἰτίας ἀγνοοῦσι καὶ περὶ τὰ θεῖα δαιμονῶσι καὶ ταραττομένοις δι' ἀπειρίαν αὐτῶν, ἣν ὁ φυσικὸς λόγος ἀπαλλάττων ἀντὶ τῆς φοβεραῆς καὶ φλεγμαινούσης δεισιδαιμονίας τὴν ἀσφαλῆ μετ' ἐλπίδων ἀγαθῶν εὐσέβειαν ἐργάζεται.

These were not the only advantages Pericles had of his association with Anaxagoras. It appears that he was also lifted by him above superstition, that feeling which is produced by amazement at what happens in regions above us. It affects those who are ignorant of the causes of such things, and are crazed about divine intervention, and confounded through their inexperience in this domain; whereas the doctrines of natural philosophy remove such ignorance and inexperience, and substitute for timorous and inflamed superstition that unshaken reverence which is attended by a good hope.

(transl. Perrin)

2§6 Accordingly, by looking for the natural causes of wonder-inducing phenomena, as Plutarch does in his own natural problems, it is not his intention to do away with divine interventions altogether or with the working of divine providence in the world (which would be the main ambition of Epicurean science).^[21] Rather, saving the phenomena by means of physical aetiology provides a useful tool against superstition (δεισιδαιμονία), enabling a person to attain a well-reasoned devotion towards the divine (εὐσέβεια). It thus serves as a first step towards genuine philosophy (i.e. theology), and it is in this sense that we are dealing in Plutarch's natural problems with a 'pre-philosophical' type of research.^[22]

Taurus

3§1 The second Platonist in line, L. Calvenus Taurus, was the teacher of Aulus Gellius in Athens and may have been one of Plutarch's students (fl. AD 145).^[23] Gellius reports that Taurus often held Q&A sessions after his lectures, and also at his table (much in the same way as Plutarch did).^[24] Two passages in particular indicate that the *Problems* were on his reading list.

3§2 In *Attic Nights* XIX 6, first of all, we find Gellius quoting a chapter from the *Problems* which he had read and discussed with Taurus in Athens (*cum Tauro nostro legissem percontatusque essem*):^[25] "Why do men who are ashamed blush, whereas those who are afraid turn pale, although the emotions are similar?" (= fr. 243 R³). Aristotle explained, so we read, that the blood of those who feel shame flows from the heart to all the body parts and so comes to the surface, whereas it rushes towards the heart in those who are afraid, thus leaving the other body parts (an idea that is, indeed, much in line with Aristotle's cardiocentric view of the body). Gellius asks for Taurus' opinion on this matter, who replies that Aristotle's explanation is apposite as to *how* the color change occurs (viz. by diffusion or concentration of blood) but not *why* this happens (*probe et uere, quid accideret diffuso sanguine aut contracto, sed cur ita fieret, non dixit*).^[26] If the emotions of shame and fear are similar, as is mentioned in the problem (παραπλησίων τῶν παθῶν ὄντων), why do they trigger such opposite physiological effects in the body? In order to illustrate this point, Taurus argues that shame is a kind (*species*) of fear, and is defined by the philosophers as 'the fear of just censure' (αἰσχύνη ἐστὶν φόβος δικαίου ψόγου).^[27] Unfortunately, Gellius does not give us any clue as to what the answer to such a more fundamental (c.q. teleological) problem may be, but perhaps his reader did not expect one from him anyway (as one would from Taurus). In the end, Gellius' appreciation of the *Problems* was mainly that of a scholar and excerptor, not of a scientist or philosopher.^[28]

Quod pudor sanguinem ad externa diffundit, timor vero contrahit.

In *Problematis Aristotelis philosophi ita scriptum est*: Διὰ τί οἱ μὲν αἰσχυνόμενοι ἐρυθριῶσιν, οἱ δὲ φοβούμενοι ὠχριῶσιν, παραπλησίων τῶν παθῶν ὄντων; ὅτι τῶν μὲν αἰσχυνομένων διαχεῖται τὸ αἷμα ἐκ τῆς καρδίας εἰς ἅπαντα τὰ μέρη τοῦ σώματος, ὥστε ἐπιπολάζειν· τοῖς δὲ φοβηθεῖσιν συντρέχει εἰς τὴν καρδίαν, ὥστε ἐκλείπειν ἐκ τῶν ἄλλων μερῶν. *Hoc ego Athenis cum Tauro nostro legissem percontatusque essem quid de ratione ista reddita sentiret, "Dixit quidem," inquit, "probe et vere quid accideret diffuso sanguine aut contracto, sed cur ita fieret non dixit. Adhuc enim quaeri potest quam ob causam pudor sanguinem diffundat, timor contrahat, cum sit pudor species timoris atque ita definiatur: 'timor iustae reprehensionis.' Ita enim philosophi definiunt: αἰσχύνη ἐστὶν φόβος δικαίου ψόγου."*

That shame drives the blood outward, while fear checks it.

In the *Problems* of the philosopher Aristotle is the following passage: "Why do men who are ashamed turn red and those who fear grow pale; although these emotions are similar? Because the blood of those who feel shame flows from the heart to all parts of the body, and therefore comes to the surface; but the blood of those who fear rushes to the heart, and consequently leaves all the other parts of the body." When I had read this at Athens with our friend Taurus and had asked him what he thought about that reason which had been assigned, he answered: "He has told us properly and truly what happens when the blood is diffused or concentrated, but he has not told us why this takes place. For the question may still be asked why it is that shame diffuses the blood and fear contracts it, when shame is a kind of fear and is defined by the philosophers as 'the fear of just censure.' For they say: αἰσχύνη ἐστὶν φόβος δικαίου ψόγου."

(transl. Rolfe)

3§3 Second, in *Attic Nights* XX 4, Gellius reports how the same Taurus, wishing to divert a (rich) student from associating with theatre people (*hominum scaenicorum*), assigned the daily reading of a specific extract from Aristotle's προβλήματα ἐγκύκλια that he sent to him (= fr. 209 R³; *misit ei verba haec ex Aristotelis libro exscripta [...] iussitque uti ea cotidie lectitaret*).^[29] Gellius quotes the extract (in Greek), headed: "Why are Dionysian artists mostly worthless people?" – the problem is still extant in the Aristotelian *Problems* that came down to us (*Problems* XXX 10). The explanation Aristotle suggested, in Gellius' version, is that "these men are least familiar with reason and philosophy (λόγου καὶ φιλοσοφίας), since they devote most of their life to the necessary arts (ἀναγκαίης τέχνας),^[30] and because they are in an intemperate state (ἐν ἀκρασίαις) most of the time, sometimes even in difficulties, both of which conditions cause

meanness (φαυλότητος)". Taurus' message is clear: the excerpt is surely meant as a witty pedagogical slap for the *morally* astray student, but at the same time it is a not-to-be-misunderstood protreptic towards the serious study of philosophy. Notably, *Problems* XXX 10.956b12 simply has σοφίας (in all manuscripts) instead of Gellius' more emphatic φιλοσοφίας. ***Artificum scaenicorum studium amoremque inhonestum probrosumque esse; et super ea re verba Aristotelis philosophi adscripta.***

Comoedos quispiam et tragoedos et tibicines dives adulescens, Tauri philosophi discipulus, ut liberos homines in deliciis atque in delectamentis habebat. Id genus autem artifices Graece appellantur οἱ περὶ τὸν Διόνυσον τεχνῖται. Eum adulescentem Taurus a sodalitatibus convictuque hominum scaenicorum abducere volens, misit ei verba haec ex Aristotelis libro exscripta, qui Προβλήματα Ἐγκύκλια inscriptus est, iussitque uti ea cotidie lectitaret: Διὰ τί οἱ Διονυσιακοὶ τεχνῖται ὥς ἐπὶ τὸ πολὺ πονηροὶ εἰσιν; ἢ ὅτι ἥκιστα λόγου καὶ φιλοσοφίας κοινωνοῦσι διὰ τὸ περὶ τὰς ἀναγκαίας τέχνας τὸ πολὺ μέρος τοῦ βίου εἶναι, καὶ ὅτι ἐν ἀκρασίαις τὸν πολὺν χρόνον εἰσίν, ὅτε δὲ ἐν ἀπορίαις; ἀμφοτέρω δὲ φαυλότητος παρασκευαστικά.

That devotion to play-actors, and love of them, was shameful and disgraceful, with a quotation of the words of the philosopher Aristotle on that subject.

A wealthy young man, a pupil of the philosopher Taurus, was devoted to, and delighted in, the society of comic and tragic actors and musicians, as if they were freemen. Now in Greek they call artists of that kind οἱ περὶ Διόνυσον τεχνῖται or "craftsmen of Dionysus." Taurus, wishing to wean that youth from the intimacy and companionship of men connected with the stage, sent him these words extracted from the work of Aristotle entitled Προβλήματα Ἐγκύκλια, and bade him read it over every day: "Why are the craftsmen of Dionysus for the most part worthless fellows? Is it because they are least of all familiar with reason and philosophy, since the greater part of their life is given to their essential pursuits and much of their time is spent in intemperance and sometimes in difficulties too? For both of these things are incentives to wickedness."

(transl. Rolfe, adapted)

3§4 With the passage from *Problems* XXX 10.956b11–15:

Διὰ τί οἱ Διονυσιακοὶ τεχνῖται ὥς ἐπὶ τὸ πολὺ πονηροὶ εἰσιν;

ἢ ὅτι ἥκιστα λόγου <καὶ> σοφίας κοινωνοῦσι διὰ τὸ περὶ τὰς ἀναγκαίας τέχνας τὸ πολὺ μέρος τοῦ βίου εἶναι, καὶ ὅτι ἐν ἀκρασίαις τὸ πολὺ τοῦ βίου εἰσίν, τὰ δὲ καὶ ἐν ἀπορίαις; ἀμφοτέρω δὲ φαυλότητος παρασκευαστικά.

Why are Dionysian artists in most cases bad people?

Is it because they least of all partake of reason and wisdom, owing to most of their life being concerned with the necessary arts, and because most of their life is passed in incontinence, and some of it also in difficulties? Both of these prepare the way for baseness.

(transl. Mayhew)

3§5 What passages like these demonstrate is that the Aristotelian *Problems* were read and discussed in school contexts, and that excerpts of specific chapters were distributed among fellow group members for contemplation, often involving some form of criticism. Reading Aristotelian *Problems* was meant to stimulate further contemplation of philosophical topics, both practical and theoretical. As such we are dealing with a versatile text, particularly useful in educational community contexts, a practice Taurus may very well have inherited from Plutarch, if, indeed, we may assume he was one of his students.

Apuleius

4§1 Another Imperial Platonist showing active philosophical engagement with Aristotle and specific acquaintance with the *Problems* is found in the figure of Apuleius of Madauros. The main source here is the *Apology*, in which Apuleius defends himself against the accusation of having used sorcery to induce Pudentilla of Oea, a well-off widow and mother of one of his fellow students in Athens, to marry him (the trial takes place in AD 158/159). One of Apuleius' main arguments is that what the accuser, Sicinius Aemilianus, brother of the first husband of

Pudentilla, considers to be magic really is nothing else than philosophy: there is nothing magical about studying nature, practicing medicine, and cultivating the gods.

4§2 In order to stroke the ego of the judge, Claudius Maximus (proconsul of Africa at the time), Apuleius insists on a shared intellectual background and erudition, which the prosecutor lacks. Maximus is addressed and represented by Apuleius as being well-educated in literature and philosophy.^[31] Apuleius' attempt to get the judge on his side is not just a casual exercise in uncalculated rhetoric and manipulation, though (*captatio benevolentiae*); Sulla's *lex Cornelia de sicariis et ueneficiis*, which treats and punishes magic on the same level as poisoning, could cost him his life.

4§3 When it comes to his 'magical' interest in the biology of fish (used by magicians in manufacturing love-philtres), Apuleius shows that there is, in fact, a well-established philosophical tradition for it. Maximus very well knows this, so Apuleius argues, since he has read Aristotle, whereas Aemilianus has not (*Apology* 36).

legat ueterum philosophorum monumenta, tandem ut intellegat non me primum haec requisisse, sed iam pridem maiores meos, Aristotelen dico et Theop<h>rastum et [t]Eudemum et Lyconem ceterosque Platonis minores, qui plurimos libros de genitu animalium deque uictu deque particulis deque omni differentia reliquerunt. Bene quod apud te, Maxime, causa agitur, qui pro tua eruditione legisti profecto Aristotelis περὶ ζώων γενέσεως, περὶ ζώων ἀνατομῆς, περὶ ζώων ἱστορίας multiuolumina, praeterea problemata innumera <cum>^[32] eiusdem, tum ex eadem secta ceterorum, in quibus id genus uaria tractantur. Quae tanta cura conquisita si honestum et gloriosum illis fuit scribere, cur turpe sit nobis experiri, praesertim cum ordinatius et cohibilius eadem Graece et Latine adnitar conscribere et in omnibus aut omissa adquirere aut defecta supplere?

Let him (sc. Aemilianus) read the monumental works of ancient philosophers, so that he finally understands that I am not the first one to have looked for these things. For a long time my masters have done so – I mean Aristotle, Theophrastus, Eudemus, Lyco, and the other successor Platonists, who have left on record many books on the origin of animals, their diet, anatomy, and differentiating characteristics. Thank goodness this case is held before you, Maximus! Of course, as an educated man you have read Aristotle's many volumes, *On the Origin of Animals*, *On the Anatomy of Animals*, and *On the History of Animals*, and the countless *Problemata* by the same man, and by others from the same philosophical school, in which various similar subjects are treated. If they earned fame and glory by writing on material which they had gathered with so much care, why would it be shameful for us to attempt this, particularly since I try to write more coherently and concisely on these matters, both in Greek and in Latin, while adding details that have been left out and correcting errors?

(transl. Hunink, adapted)

4§4 Apuleius' aim in the passage at hand is to fashion himself as a Platonic philosopher with great expertise in Aristotelian science and research.^[33] He writes on the same biological topics as Aristotle (*cum suis*) did before, but more systematically and succinctly, in two languages, and while making additions and corrections (the traditional *imitatio*–*aemulatio* tension). Striking is the way in which Apuleius plays off Aristotle's authority in the face of legal authority in court. According to Hunink, "it is rather unlikely that Maximus had actually read Aristotle's technical and voluminous zoological works, although he would surely not openly admit this. So, Apuleius is almost making fun of Maximus [...], or, better phrased, his strategy of bluffing and intimidating is now also directed at the judge."^[34]

4§5 The reference to the *Problems* may be to Book X, the Ἐπιτομή φυσικῶν, which is the longest in the collection and draws heavily on Aristotle's biological writings (as those listed by Apuleius), but this remains uncertain.^[35] Interestingly, there is a reference to the anatomy of ovoviviparous animals, including fish, in *Problems* X 43.^[36] This is the only passage in the *Problems* mentioning the concept of ζωτοκία, which is significant, because Apuleius shows pride in having introduced the concepts of 'viviparous' and 'oviparous' in Latin parlance (translating the Greek ζωτόκα and ὠτόκα respectively: *Apology* 38). Scholars confirm that this is, indeed, his own invention.

4§6 At the end of the quoted paragraph, Apuleius asks a court attendant to bring one of his books on natural science: he asks for a volume from his Greek "natural questions" (*quaestionum naturalium*), namely the one on fish, and cites from it. Unfortunately, the work is lost and the

citation itself is not preserved in the manuscripts. Considering its title (and the content-related questions raised in *Apology* 38),^[37] it may have been in Q&A format, like the Aristotelian *Problems*, but this is uncertain.^[38] In any case, the fact that Apuleius aims to supplement Aristotelian science (*aut ommissa adquirere aut defecta supplere*) seems to be in line with the primary intention of the *Problems*, which is to attach further “particulars to the universals of *scientia* developed in systematic treatises”.^[39]

4§7 Apuleius’ main point remains clear. When it comes to cutting up fish or investigating their liver, so we read further on (*Apology* 41), why would a philosopher not be allowed to do what a butcher, a cook, or a soothsayer does? If by this Apuleius is trespassing the law, this is not actually his fault, but Aristotle’s, so it would make more sense to “banish his books from the libraries and wrench them from the hands of scholars” (*cuius nisi libros bibliothecis exegeris et studiosorum manibus extorseris, accusare me non potes*). According to the *lex Cornelia* mentioned above, such books should be publicly burnt.

4§8 As James Lennox observes, biological studies soon disappeared after Aristotle and Theophrastus in Hellenistic times.^[40] Many probably doubted whether animals and plants, by their contingent nature, could serve as legitimate objects of theoretical science. Apuleius may have had less difficulty in finding the necessary theoretical backing for his biological interests, but it remains to be seen how genuinely Aristotelian this backing really was. Despite his Aristotelian interests, Apuleius tries to come off as an avid Platonist – an intellectual stance relatively close to Plutarch’s. There is nothing inconsistent in assuming that an essentially Platonic agenda underlay his ichthyological research (‘physics’?). He suggests (*Apology* 39) that it is not disgraceful for a philosopher “belonging to the Platonic school” (*qui se Platonicae scholae meminerit*) to “recognize the hand of Providence even in these things” (*nosse quanta sit etiam in istis providentiae ratio*), that is, to demonstrate that the realm of seemingly contingent biological phenomena ultimately relies on a providential ordering.^[41] The fact that Apuleius does not distinguish between the Peripatetic and Academic schools in *Apology* 36 (quoted above), where he lists famous Peripatetics along “other successor Platonists” (*Platonis minores*), is probably meant to underline not just the close affiliation between both schools (in his opinion), but also his own, primary allegiance to Plato. What is more obvious, though, and more useful in shrugging off the accusation of sorcery, is the idea of scientific progress and active philosophical engagement with Aristotle.

Conclusion

5§1 In conclusion, it can be said that the time of the Roman Empire introduced a considerable increase in the popularity of the Aristotelian *Problems*. Thanks to the expansion of social and intellectual networks all over the Mediterranean region the collection circulated in numerous and various contexts. My treatment of this tradition is by no means exhaustive, but that is not its aim. Instead, I wished to sketch the general lines of the reception process, with specific emphasis on Platonic readers and readings. Some points remain tentative and preliminary, due to a lack of sources or testimonies, especially in the cases of Taurus and Apuleius.

5§2 As far as we can positively demonstrate, Taurus was mainly interested in the *Problems* as a school text, underlining the work’s educational value. His critical reading is meant to occasion further contemplation among his students of specific problematic topics, both theoretical and practical. The fact that Taurus may have been one of Plutarch’s pupils can account for this approach. As to Plutarch’s interest in the *Problems*, a similar educational agenda can be discerned. We have seen that his reading is mainly methodologically motivated. What seems to be very different between Plutarch’s natural problems and those ascribed to Aristotle, however, is the epistemological fundament on which their natural scientific research is based. Plutarch postpones final judgement (ἐποχή), since he, in line with Platonic-Academic theory, refuses to put much confidence in knowledge deriving from sensory data, whereas Aristotle’s avoidance of argumentative conclusiveness was more practically motivated, aiming to foster further research and debate of specific scientific topics in the Lyceum context. In the end, Aristotle put much more trust in the feasibility of natural science than Plutarch, as an Academic Platonist, ever did. This is very unlike Apuleius, who proudly declares that he continues Aristotle’s research agenda, placing himself in line with other Peripatetics – or *Platonis minores* as he prefers to call them. His aim is to ally Aristotle with Plato (as other middle- and neo-Platonists did), which was probably not just a handy rhetorical stance. Apuleius’ Platonism may have added a more theoretical dimension to

his biological research, by demonstrating that the realm of seemingly contingent phenomena ultimately relies on a providential ordering.

§3 What the three Platonists have in common (despite their differences) is an active intellectual engagement with Aristotle and the *Problems*. Their reading is dynamic, not static, and aims at innovative contributions to the Stagirite's scientific enterprise. This dynamism will play a key-role in the later history of the text. It is, in fact, only in the 16th century that the *Problems* will start to lose their scientific relevance, thus gradually being reduced to the status of genuine literature.^[42]

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- [1] For the full versions, see *Problems* I 1.859a2–3; III 17.873a37–b23; IV 30.880a30–33 respectively.
- [2] Exemplary of how the *Problems* creatively recycle Aristotle's authentic doctrines is the analysis of the famous chapter on melancholy (*Problems* XXX 1) by van der Eijk 1990. The author of this chapter was clearly familiar with Aristotle's scattered remarks on melancholy and perhaps intended to systematize them.
- [3] Mayhew 2015:vii.
- [4] Aristotle sporadically auto-references the *Problems* throughout his writings: see *Meteorology* II 6.363a24 (cf. also IV 3.381b13); *On Sleep* 2.456a29; *On Youth* 5.470a18; *Parts of Animals* III 15.676a18; *Generation of Animals* II 8.747b5; IV 4.772b11; IV 7.775b37.
- [5] The debate about the collection's authorship and authenticity dates back to medieval scholarship. See Williams 1995:45.
- [6] Cf. the titles in Centrone 2011 and Mayhew 2015.
- [7] This resulted, most prominently, in the publication of a new English translation (Mayhew 2011) and two edited collections of essays covering a wide variety of topics dealing with the collection's intellectual background (Centrone 2011; Mayhew 2015). Generally useful for the text's later history are Blair 1999 and the contributions in De Leemans and Goyens 2006 (with a selected bibliography at 295–317). See also esp. Lawn 1963, Filius 1999, Cadden 2013 and De Leemans and Hoenen 2016. Most of these studies remain selective in their approach. For a general introduction to the collection and its *longue durée*, see Flashar 1962:295–384, Louis 1991:vii–xxxv, Bertier and Filius 2003.

[8] Louis 1991:xxxiv is right that: “Dès l’antiquité, en effet, la collection des *Problèmes* a été l’une des oeuvres les plus lues d’Aristote.” Marenghi 1961:40 speaks of the second century CE as “l’*aurea aetas dei Problem*”. The evidence shows that the collection drew the attention of a wide range of readers, including ancient philosophers, doctors, sophists and scholars.

Aristotle’s *Problems* are quoted by a variety of Greek and Roman authors, such as Apuleius, Athenaeus, Cicero, Clement, Galen, Gellius, Macrobius, Plutarch and Seneca. Scholars agree that there must have been a more voluminous collection, which is no longer extant (presumably Andronicus’ edition, which may have been in 70 books – whereas the extant collection is in 38). In addition, a number of new collections of problems were composed, each of which shows clear overlaps with, and also clear departures from, Aristotelian orthodoxy. For a general overview, see Marenghi 1961:39–44, Flashar 1962:359–370, Bertier and Filius 2003:582–583.

[9] As Frede 1987:282 rightly observed, “someone who saw himself as basically a Platonist at this [sc. Imperial] time would be inclined to study Stoic or Peripatetic physics”. On the reception of Aristotelian philosophy in the time of the Roman Empire, see most recently the contributions in Lehmann 2013.

[10] To know how the authorial voice (i.e. the author’s *ego*) manifests itself as a discursive category in ancient scientific texts is, of course, important in determining the author’s role in the process of knowledge communication (e.g. Taub and Doody 2009), but it is not the only factor that determines the eventual success of a specific scientific endeavour.

[11] Due to their often peculiar style both in raising and solving questions, seriousness is not necessarily a self-evident reaction in reading the Aristotelian *Problems*. This is illustrated e.g. by Athenaeus, who reports that Matreas, an itinerant showman from Alexandria, wrote parodies of Aristotle’s *Aporiai* and read them in public (*The Learned Banqueters* I 19d–e: ἐποίησε δ’οὗτος καὶ παρὰ τὰς Ἀριστοτέλους ἀπορίας καὶ ἀνεγίνωσκε δημοσίᾳ). The questions Matreas raised are quite humorous, indeed, and they clearly have the peculiar style of the *Problems* as is marked by their paradoxical character: ‘Why does the sun sink but not dive?’, ‘Why do sponges soak up wine but not get drunk?’, ‘How can accounts be reconciled, if they don’t argue with one another?’.

[12] On the aspect of play in Plutarch’s *Table Talk*, see Frazier 1998. The notion of σπουδογέλοιον is nowhere expressed with this precise term in the *Table Talk*. Yet, in several passages Plutarch does advocate a healthy balance between seriousness and play, which he connects with sympotic protocol. E.g. *Table Talk* I 4.621D–E (ἔστι γὰρ καὶ γέλωτι χρῆσθαι πρὸς πολλὰ τῶν ὠφελίμων καὶ σπουδῆν ἡδεῖαν παρασχεῖν); II 1.629F (οὐ γάρ τι μικρόν [...] τῆς ὁμιλητικῆς μόριον ἢ περὶ τὰς ἐρωτήσεις καὶ τὰς παιδιὰς τοῦ ἐμμελοῦς ἐπιστήμη καὶ τήρησις); VI *praef.*686D (τὰ δὲ φιλοσοφηθέντα μετὰ παιδιᾶς σπουδάζοντες εἰς γραφὴν ἀπετίθεντο). Intellectual entertainment and instruction were important aspects of the symposium: e.g. Roskam 2009. For the notion of σπουδογέλοιον in ancient Greek literature more generally, see Arnould 1990:113–122.

[13] On the educational backdrop of Plutarch’s *Causes of Natural Phenomena* (Αἰτίαι φυσικαὶ = *Quaestiones naturales*), a collection of around 40 natural problems modeled after the Aristotelian *Problems*, see Meeusen 2017:187–233.

[14] A witty allusion both to Aristotle’s ambulant teaching method and his followers, the Peripatetics.

[15] That is probably why, in the passage at hand, Plutarch stresses, in a very programmatic way and with a quote from Aristotle himself, that “all-round education produces many starting points” (fr. 62 R³: τὴν πολυμάθειαν πολλὰς ἀρχὰς ποιεῖν).

[16] See Meeusen 2012.

[17] See Opsomer 1998.

[18] A practice inspired by the εἰκὼς μῦθος of the *Timaeus*: see Kechagia 2011.

[19] E.g. *Table Talk* I 10.628D (ἐγγυμνάσασθαι [...] ὁ λόγος παρέξει), III 1.646A (γυμνασίας ἔνεκα καὶ ζητήσεως), *Advice about Keeping Well* 130A (περὶ γυμνασίων φιλολόγοις ἀρμοζόντων).

[20] See Meeusen 2015.

[21] For the incorporation of mythological material in Plutarch’s natural problems as a hint at a ‘higher’ type of causality, see Meeusen 2013.

[22] As Van der Stockt 2011:452 aptly put it, it is “a leg up for philosophy at its best”.

[23] On Taurus' role in the *Attic Nights*, see Lakmann 1995:216–220 (on his “Schulpraxis”) and 227–228 (for his relationship with Plutarch; Lakmann remains sceptical). See also esp. Holford-Strevens 2005:90–97. On his (sympotic) teaching methods, see Roskam 2009:377–379 (with n30 for further reading).

[24] *Attic Nights* I 26: *dabat enim saepe post cotidianas lectiones quaerendi, quod quis uellet, potestatem*. In *Attic Nights* VII 13 (cf. also XVII 8), Gellius reports that Taurus had the custom of inviting some of his students (viz. the *iunctiores*) to dinner at his house. Each prepared an ingenious question (*argutias quaestionum*) suitable for conversation. The topics for discussion were not weighty nor serious, but light and trifling problems, suitable for a mind enlivened with wine (*Quaerebantur autem non grauiā nec reuerenda, sed ἐνθυμημάτια quaedam lepida et minuta et florentem uino animum lacescentia*). On the practice of ἐρώτησις with the middle- and neo-Platonists, see Snyder 2000:111–118.

[25] Oikonomopoulou 2013:137 connects this with the ancient school practice of συνανάγνωσις (i.e. ‘reading together’, under the guidance of a teacher in class), common in later antiquity. See Mansfeld 1994:193–194.

[26] Indeed, as a rule, the διὰ τί of the *Problems* inquires almost exclusively into the material and efficient causes of natural phenomena, not the final ones (see Mayhew 2011:I,xxii–xxiii; Stoyles 2015). Therefore, Taurus' objection is certainly justifiable.

[27] On the philosophical backdrop of this “Stoic definition with Platonic garb” see Holford-Strevens 2005:94 with n60.

[28] Gellius repeatedly quotes from the *Problems* and praises them for their charm, as being “most delightful and filled with choice knowledge of all kinds” (*Attic Nights* XIX 4.1: *lepidissimi et elegantiarum omnigenus referti*). This does not alter the fact, however, that natural science is “not beneath his cognizance but above his head” (Holford-Strevens 2005:261; notably, most of his quotations have ethical implications). In quoting the problem on the effect of winds on the color of the sea (*Attic Nights* II 30.11), Gellius again omits the explanation. The same may be true for the allegedly lacunary ending in *Attic Nights* I 11.17–19 (regarding the psychological effect of music in battle). His contribution to the problem in *Attic Nights* XVII 8 (on the freezing of different kinds of liquid) is not the most ingenious one, nor does his remark at the end of the chapter suggest that he excelled in intellectual conviviality (*tempusque esse coeperat edendi et tacendi*).

[29] For speculation about the nature and content of the προβλήματα ἐγκύκλια, see Meeusen 2016.

[30] I.e. ‘necessary to survive’, ‘distressful’, ...? But perhaps also in allusion to slavery (e.g. *Iliad* XVI 836: ἡμᾶρ ἀναγκαῖον, “day of constraint, i.e. life of slavery”, see LSJ, s.v.)? Gellius qualifies the comic and tragic actors and musicians, with whom the disciple associated, as *ut liberos homines* (“as if they were freemen”).

[31] The Second Sophistic culture of παιδεία is omnipresent throughout the text. See Harrison 2000:39–88.

[32] At this point, I disagree with Hunink's text, who translates (Harrison, Hilton, and Hunink 2000:61) “and the countless *Problemata* by the same man, and works by others from the same philosophical school, who deal with various similar subjects” (*praeterea problemata innumera eiusdem, tum ex eadem secta ceterorum, in quibus id genus uaria tractantur*). Manuscripts FΦ have a lacuna before *eiusdem* (the authority of these manuscripts has been widely accepted in modern scholarship). Krüger 1864:46 may be right that a *cum* fell out. The result is not just “a perfectly Ciceronian balance with the following *tum*” (Hunink 1997:II,115; cf. e.g. *Apology* 38.5) but is also in line with the ancient evidence that collections of *Natural Problems* circulated not only under Aristotle's name. Cf. Flashar 1962:309: “Hier wird also angespielt auf eine im Peripatos entstandene Problem-Literatur, von der uns sicher vieles verloren ist.” See e.g. Galen *On the Powers and Mixtures of Simple Drugs* II 5 (XI 474 Kühn = fr. 223 R³): ὁ Ἀριστοτέλης καὶ Θεόφραστος, ἕτεροί τε τινες ἄνδρες φιλόσοφοι, τὰ τοιαῦτα τῶν προβλημάτων ἐν τοῖς φυσικοῖς ζητήμασιν προβάλλουσι τε καὶ λύουσι. Among Theophrastus' works, to go no further afield, Diogenes Laertius lists one Book Περὶ τῶν προβλημάτων φυσικῶν (twice: V 48 and 49), a collection of Προβλήματα πολιτικά, φυσικά, ἔρωτικά, ἠθικά (V 47), and also a Προβλημάτων συναγωγή in one (V 48) and five (V 45) Books (= fr. 137, 26 and 727, 3–5 FHSG).

[33] Cf. e.g. *Apology* 41: “Actually, I have taken up this study (sc. of Theophrastus and Nicander) through study of Aristotle and a desire to emulate him, with no little encouragement from my

master Plato, who says that anyone investigating such matters ‘plays a game in his life that he will not regret’ (cf. *Timaeus* 59d).”

[34] Hunink 1997:II,115.

[35] The reference to the *Problems* in *Apology* 51 is to a chapter on epileptics that is now lost (fr. 240 R³).

[36] The reference is to “animals that bear live young, not at first but later in themselves, as some fish do” (*Problems* X 43.895a39-b3: ὅσα δὲ μὴ τὸ πρῶτον, ὕστερον δὲ ζωοτοκεῖ ἐν αὐτοῖς, οἷον ἔνιοι τῶν ἰχθύων). That the reference is, indeed, to ovoviviparous animals is confirmed by Mayhew 2011:I,316n77, following Louis 1991:212n123 (cf. *Generation of Animals* I 3.716b35).

[37] *Apology* 38: “which kinds (sc. of fish) are engendered through intercourse, which kinds grow from mud, how often and in which season the females and males of each species are willing to mate” etc.

[38] In that case it must have resembled Plutarch’s so-called *Quaestiones naturales* (*Causes of Natural Phenomena*) more than Seneca’s (cf. Hine 1980:27–29).

[39] Blair 1999:175.

[40] Lennox 1994. Apuleius may have relied on an epitome of Aristotle’s zoological writings rather than on Aristotle directly (see id.:14–17). We have note of an epitome on the nature of fish by Aristophanes of Byzantium (John Lydus, *The magistracies of the Roman state* III 63:

Ἀριστοφάνης δὲ ὁ Βυζάντιος ἐν τῇ Ἐπιτομῇ τῶν ἐν ἰχθύσι Φυσικῶν).

[41] Cf. *Apology* 27.2 and 49. On *Providentia* in Apuleius, see Regen 1971:83–91.

[42] That is when the Aristotelian and Galenic paradigms in natural philosophy and medicine respectively start to stagnate and eventually decline. See Bertier and Filius 2003:588.